

## ABSTRACT

Methods of forming a gate dielectric layer, and a composite gate dielectric layer, for a thin film transistor, has been developed. A first embodiment of this invention describes the procedure used to create the composite gate dielectric layer. A first, thin silicon oxide gate dielectric layer is thermally grown on an underlying active semiconductor layer, such as polysilicon. A first anneal procedure, is performed at a temperature greater than the temperature used for the thermal growth of this layer, resulting in improved parametric integrity. A thicker, second silicon oxide gate dielectric layer is then thermally deposited, followed by an anneal procedure used to provide a composite gate dielectric layer comprised of a densified, thermally deposited second silicon oxide gate dielectric layer, on an underlying, thermally grown first silicon oxide gate dielectric layer. A second embodiment of this invention entails the use of the densified, thermally deposited, second silicon oxide gate dielectric layer, directly on the polysilicon, active layer.